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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,885	10/15/2003	Kunio Satomi	1232-5176	7563
27123	7590	09/13/2004	EXAMINER	
MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101			PAREKH, NITIN	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 09/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/686,885

Applicant(s)

SATOMI ET AL.

Examiner

Nitin Parekh

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to because figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Correction is required.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murayama (US Pat. 6303998).

Regarding claims 1 and 2, Murayama discloses an area array semiconductor device (Fig. 3) comprising:

- a circuit wiring substrate/CWS (10 in Fig. 3) having a circuit wiring (Col. 1)
- a semiconductor chip (12 in Fig. 3) mounted on the circuit wiring substrate and electrically connected with the circuit wiring, and
- a sealing layer composed of an underfill/sealing resin (not numerically referenced in Fig. 3, see 18 in Fig. 2b; Col. 5, lines 1-15)

- the underfill/sealing resin layer surrounding the chip having a fillet such that the underfill/sealing resin layer forms an outline corresponding to that of the chip and extending beyond the periphery of the chip (not numerically referenced in Fig. 3, see Fig. 2b), and
- the chip being inclined with respect to the CWS at an angle of about 45 degree to reduce warpage of the sealed device (Col. 5, lines 20-45)

(Fig. 3; Fig. 2a-2c; Col. 4, line 65- Col. 5, line 45; Col. 1-5).

Murayama fails to explicitly teach the sealing layer having an angle of 30-60 degree with respect a side the CWS.

However, Murayama teaches the underfill/sealing resin layer having the outline at the bottom of the fillet along the peripheral sides of the CWS corresponding to that of the chip such that the chip has substantially the same angle with respect to the side of the CWS as that of the underfill/sealing resin layer. Furthermore, since the chip being at the angle of 45 degree with respect a side the CWS, it would have been obvious to a person of ordinary skill in the art at the time invention was made to realize that the sealing layer can be incorporated having an angle of 30-60 degree with respect the side the CWS.

Regarding claim 3, Murayama teaches substantially the entire claimed structure as applied to claim 1 above, wherein Murayama further teaches the device being

bonded/soldered to solder bumps of an electronic circuit board/printed wiring board (PWB) as a mother board (28 in Fig. 8; Col. 7, lines 10-15).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murayama (US Pat. 6303998) in view of Gaku et al. (US Pat. 6350952).

Regarding claim 4, Murayama teaches substantially the entire claimed structure as applied to claims 1 and 3 above, except the device being soldered to the PWB using lead-free solder.

Gaku et al. teach using bumps made of conventional lead-free solder (see a in Fig. 1 and 2; Col. 3, line 58; Col. 9, lines 21-58).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the device being soldered to the PWB using lead-free solder as taught by Gaku et al. so that the lead exposure can be reduced and the material handling can be simplified in Murayama's device.

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**Conclusion**

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference B is cited as being related to a device having a sealing resin.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 571-272-1663. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

NP

09-01-04



NITIN PAREKH

PATENT EXAMINER

TECHNOLOGY CENTER 2800